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UNIVERSITY OF ALBERTA

TEACHERS' REACTIONS TO AN INSTRUCTIONAL RESOURCE DISK

BY

SYDNEY WAYNE NUGENT



A thesis submitted to the Faculty of Graduate Studies in partial fulfillment of the
requirements for the degree of MASTER OF EDUCATION.

DEPARTMENT OF ELEMENTARY EDUCATION

Edmonton, Alberta

FALL 1993



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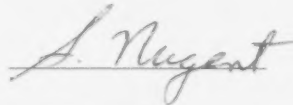
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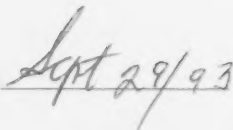
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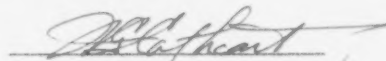
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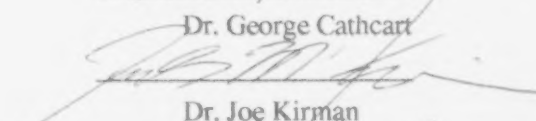
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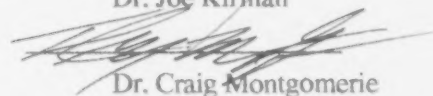
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Dr. George Cathcart



Dr. Joe Kirman



Dr. Craig Montgomerie

Date: September 8, 1993

DEDICATION

This thesis is dedicated to the memory of my father, George,

the help from my mother, Norma,

and the support and understanding of my family

Beverley, Bonnie-Jean and Reggie.

ABSTRACT

This study investigated teachers' reactions to a resource disk on which was stored social studies instructional material at the grade four level. Teachers used the resource disk templates and generated multiple instructional materials.

The researcher participated as a resource person, or coach, during the construction sessions where the teachers constructed their own instructional material. The researcher recorded the two teachers' reactions while they produced their own teaching material.

The Macintosh environment was chosen because it was easy to learn, and materials could be easily and quickly saved, edited and retrieved. The MsWorks program was chosen for the way it handled graphics. Individualized teacher instruction was used to help the teachers acquire practical understandings of the computer's capabilities and flexibility in constructing material for their personal style of teaching.

The individual coaching sessions gave the teachers an understanding of the computer processes and how these could be applied to the construction of teaching material. A major advantage to having information and templates in an organized computerized resource is to save time in modifying instructional material.

The conclusions of this study were that during the development of the instructional material the teachers needed an appropriate computer environment, an all-inclusive application program, and the provision of prepared instructional material. They could modify the resource material quickly to suit constantly changing student needs.

A final reaction of the study indicated that teachers would use the computer equipment and programs if it would facilitate the construction of suitable instructional material appropriate for their individual students and without increasing their preparation time.

This implies that computer technology does have a practical application for teaching. Procedures and products must offer freedom of modification of instructional material and appropriate personalized training. The provision of a centralized resource center where information could be sorted, collected and organized for immediate access would be of great benefit to teachers in constructing their own teaching material.

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I wish to thank the many people whose participation, guidance and encouragement contributed to the completion of this thesis.

First, I am grateful to the teachers who participated in this study. While their true identities will remain confidential, I sincerely appreciated the enthusiasm I received when demonstrating and using the resource disk with them.

George Cathcart, my thesis advisor, was a guiding influence throughout the project. His discussions and helpful suggestions focused my attention throughout my thesis work.

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CHAPTER 1

INTRODUCTION TO THE STUDY

Instructional material suitable for students can be constructed using computer technology. The computer can facilitate the design, production and storage of appropriate instructional materials. Computerized processes offer the teacher time-savings in instructional planning.

The researcher found the computer to be a useful tool for instructional planning. Yet, there were few computerized resources containing instructional material that would allow modification for individualized instruction. Could a computerized resource disk be used by classroom teachers? Could a teacher modify the material on a disk to suit various teaching and learning styles? How would teachers respond to such a resource?

Purpose

The purpose of this study is to observe and describe two teachers' initial reaction to a new digital resource. The specific research question is, "What is the initial reaction of teachers to a new technology-based curriculum resource?"

Significance

This qualitative study will add to the body of knowledge regarding the practices and processes of constructing instructional resources. In particular, it will add information about how teachers in this study reacted to the computerized resource disk and its computer processes. A favourable reaction may have significant implications for curriculum development. Educational programmers could consider elements related to teachers' initial reactions in designing and marketing an instructional disk with resource materials that teachers could modify.

Limitations and Delimitations

This study was restricted to grade four social studies, two teachers, the Macintosh computer, and Microsoft Works integrated software. It was concerned solely with the

initial reactions of teachers to the resource disk and therefore did not involve observations on how constructed material was used in the classroom, how students responded to it, or teachers subsequent evaluation of their work. Several factors impact upon this study. It is limited by current instructional practices and the present state of computer technology in the schools. Since this study was done with a small sample of teachers it is not possible to generalize it to the entire teacher population. Another limiting factor was the scarcity of grade four elementary social studies teachers with Macintosh word processing and graphics expertise.

Organization of the Thesis

Chapter one introduces the study. A synthesis of related research is found in chapter two. Chapter three contains a description of the resource disk development and the methods of data collection and analysis. Chapter four presents the data gathered from the construction sessions and teachers' reactions to the resource disk concept. Chapter five contains a summary, some interpretations, a descriptive model, some implications and further research questions.

Background Information

The researcher's previous experience with different brands of computers affected his choice of computer for this research. Prior to this study, the researcher had attended university classes to study principles of computer programming, applications and data base management. Coaching procedures used in the delivery of some in-service sessions attended by the researcher influenced choice of coaching as one element of the research methodology. The researcher preferred coaching due to the on-going dialogue between the researcher and the teacher. Coaching provided the researcher with a way of studying teachers' reactions during the study and provided the teachers with immediate help when needed.

Summary

Relatively little is known about providing teachers with computerized instructional material. If teachers learned the modification processes available when using a computer, they could construct personalized instructional material for use in their own classrooms.

To facilitate this, the study was designed to observe two teachers' initial reaction to a new digital resource disk.

CHAPTER TWO

THE RESEARCH LITERATURE

The development of the resource disk was influenced by the principles of computer programming, applications and database management. Pertinent studies related to the availability of instructional resource material on the computer and teachers' construction of computerized instructional material are cited here as background for the evolution of the resource disk concept.

Teacher's Approach in Constructing Material

This section of the literature review covers the teacher's expanded role when the computer is introduced into classroom instruction. Ehman and Glenn (1987) found that the computer allowed the teacher to become a facilitator of learning rather than a dispenser of knowledge. A teacher as a facilitator would focus on higher level thinking skills and help students use knowledge creatively to solve problems. However, Kendall (cited by Carpenter, 1992) stated that the computer will not replace the teacher's use of amusing and appropriately timed historical anecdotes, nor can the computer impart feelings from people, places and events which happened in history. Carpenter (1992) states that Taylor (1987) also contends that the teacher can emphasize judgment and skill, and encourage people. Thus, he suggests the teacher's role will be that of an information navigator.

Regarding the social studies curriculum, Carpenter (1992) feels that "technology will not change the goals and traditional content of social education" but "will reshape how things are taught" and make the teacher's life a little easier." (p. 39) Bowers (1988) says that computers are good at conveying facts, but not good at conveying the context and interpretation of culture (cited by Ragsdale, 1991).

Dronka (1985) states that social studies classes have changed little over the past ten years due to a shortage of computers for teacher use, a lack of high quality software, and little research in how the use of computers affects student achievement (cited by Ehman and Glenn, 1987, p. 22).

Ehman and Glenn (1987) state that the computer can influence preparation, delivery and evaluation of a lesson. They also found that there was little computer use in schools due to a combination of the lack of specific content-related software and lack of preparation time necessary for teachers to create specific software or to integrate existing software into

their current curriculum.

Male (1988) reported that teachers using computers with cooperative learning strategies "promoted greater quantity and quality of daily achievement, more successful problem solving, and higher performance on factual recognition, application and problem-solving test items" (cited by Hunt and Alford, 1992, p. 34).

Olds (1982) found that designing whole class, teacher directed lessons is a complex task. Incorporating cooperative learning strategies and managing computer access further complicated the endeavour (cited by Hunt and Alford, 1992, p. 34). The complications were "positive goal interdependence, face-to-face promotive interaction, individual accountability, effective social skills, and group processing" (Olds (1982) cited by Hunt and Alford, 1992, p. 34).

A project was conducted by Pollak and Breault (1985, cited by Ehman and Glenn, 1987) in which teachers were given access to on-line lesson plans and supporting contemporary newspaper articles. They found that some teachers used and adapted the lessons extensively (Ehman and Glenn, 1987). However, adaptation in instruction happens moment-to-moment in response to an individual student or groups of students. This kind of adaptation is "spontaneous, intuitive or interactive" (Joyce, Brown, and Peck, 1981).

Technological Change Influencing Instruction

The "computer-as-a-tool" metaphor is recognized by Cummings (1992) and he feels that won't change. A tool is usually made for a specific use by the creator but it is deemed more useful if it can be used for other things.

If a computer is a tool like other tools in schools, then educators should know appropriate uses and be aware of abuses when using it. The correct use of the computer will affect teaching effectiveness and time management, relative to other effective and available tools that could have been selected (Ehman and Glenn, 1987).

The computer is changing the social and cultural context of teaching because teachers now have speedy access to more information. As a tool, the computer requires less labour but necessitates the acquisition of new skills (Deer and Neal, 1987).

Until the 1970s, schools were mainly organized on the basis of relatively prescriptive programs of study using centrally determined syllabuses of instruction. Teaching skills required were closely related to implementation of these programs. Contemporary school programs reflect constant changes in curriculum organization,

content, pedagogy, and assessment. Changes are based upon the results of continuing needs assessments by school officials and new theories and research in education.

Professional development activities supporting teacher change should be responsive to the needs of teachers and have immediate application in the classroom. When planning for technological change, one key area to be stressed is the background teachers have for technological advance. A demonstration of potential uses of new technology should be provided. Techniques for classroom and school management of data should be discussed. Teachers should be given opportunities to develop, design and evaluate computer software. Provision for "hands-on" experience in the use of self-paced, multi-media packages is a necessary part of computer training (Deer and Neal, 1987).

Barnes (1982) suggest that the "research culture acts autonomously, yet co-operatively, for its existence depends upon the free circulation and common use of information, ideas, images and theories." (p. 22) It does not demand that its members surrender their individuality. If teachers are considered as researchers, their use of information, ideas, images and theories should be circulated to other teachers. Ehman and Glenn (1987) agree that teachers' practical experience should be communicated to other teachers. Poirot (1992) states that when technology is implemented into the classroom, teachers are the classroom experts because they have the subject knowledge, and are in the best position to analyze the advantages and disadvantages of any tool. However, he admits collecting and analyzing data is time consuming, time which teachers do not have. Success in technological change, Poirot (1992) explains, must demonstrate improvement in content-area knowledge and address teacher needs, attitudes and concerns.

How new technology can meet teachers' needs is critical in planning technological change in the classroom. Poirot (1992) says that classroom change can be either imposed or voluntary. However, if the need for change is unclear, teachers will be ambivalent towards the transition. No change will result unless the purpose, the evolution and the participation processes are clear.

Louis and Miles (1990) state no one can be "sold" a vision even if attracted to it. However, "individuals will develop the meaning of the change and will probably only find this meaning by experimenting with the innovation" (cited by Farley, 1992, p. 8). Sometimes computers are deployed without apparent meaning to the teachers. In some cases, computers were delivered to classrooms but teachers were given no time to discuss what computer technology could do for them. Other teachers were told exactly how to use the computer but were not allowed to deviate from the prescribed usage. Ragsdale (1991) supported this latter view of computer use when he stated that computer tools are being

used but not necessarily being applied. Nelson (1990) argued that this view of technology will lead to an emphasis on means over ends (cited by Ragsdale, 1991, p 160). However, Jones (1990) believes that the computer will liberate mankind in the field of written communication (cited by Ragsdale, 1991, p 160).

Ragsdale (1991) indicated that "computer use in an active learning environment is not necessarily supportive, but an active learning environment without computers is viable by itself" (p. 160). Similarly, other available and effective tools such as the VCR and photocopier have proven their usefulness in instruction as mentioned by Ehman and Glenn (1987).

When considering technological change, Hergert and Mundry (1989) mention five types of adopters, "the innovator eager to try new ideas, the leader, the early majority who are cautious and deliberate about following the innovation, the late majority who are skeptical but can be won over by peer pressure and administrative expectations, and the resister who is suspicious and opposed to new ideas" (cited by Farley, 1992, p. 8-9). These types of people should be considered in designing programs for teacher change.

According to Fullan (1991) the teacher's role is changed by "immersing oneself into the change where common sense and personal and political forces must intermingle" (cited by Farley, 1992, p. 8).

Computerized Instructional Resource Material

Instructional material should be "varied in medium, relevant, presented well, concept-based, open to student activity and reflection, and under the control of the school rather than pre-packaged" (Barnes, 1982, p. 88-89).

Teachers can only sparingly supplement existing material because they spend time guiding pupils, teaching skills and selecting material in the teaching/learning process. Most teachers lack sufficient time and/or content-specific background knowledge to develop their own materials, and therefore, instruction may depend directly on existing materials (Barnes, 1982).

To support instructional planning, a central production and computerized storage center for instructional resources is needed by teachers. These centers should be large enough to function efficiently and small enough to be under cooperative school control so that the material is effectively produced and stored (Barnes, 1982).

However, any approach that employs coaching will give the user the time needed to learn the content and process as well as applause, care, concern and compassion from the

facilitator (Cummings, 1992). The coaching implementation method will allow observation of how cost effective computers are in terms of time. Coaching will also allow concise exchange of practical experience communicated among teachers (Ehman and Glen, 1987).

Development of a Resource Disk

In order to initiate divergent thinking, curriculum developers must start with the teachers (Eisele, 1971). It follows that increased computer application at the school level should start with teachers. Teachers should gain an understanding of computer processes as they use them for instructional purposes. As this understanding increases uses should become more divergent.

There are two distinctly different kinds of curriculum planning processes, theoretical and practical (Goodlad, 1963). Theoretical understanding of computer technology may not represent a practical use for teachers. Perhaps, if practical instructional uses were available, teachers could develop their own theoretical understandings of computer technology through applied classroom use. Planning for instruction fosters teacher decisions about immediate and practical resources they can find, adapt and use. Only after obtaining the appropriate resources, can teachers think about the learnings and activities and their sequencing within the subject (Goodlad, 1963).

Instructional planning usually involves putting something on paper. Sequencing of objectives, skills, and attitudes with instructional materials may end up as elaborate lists of learnings. Developing an instructional process involving the "creative synthesis of learners, subject matter, and the kinds of learnings intended" is a very difficult but commendable task (Goodlad, 1963, p. 321). Because time deadlines must be met, ideas may be only roughly translated onto an instructional page. Time constraints change "the dynamic interchanges envisioned (by the teachers and they begin) collapsing (them) into a dull listing of topics for study" (Goodlad, 1963, p. 321). Dull unsuitable instructional material would also result when time for modification of instructional material is limited. The computer could decrease the preparation time needed to create the synthesis of learning/teaching styles and subject matter by the modification of existing computerized instructional material and the printing of it.

Curriculum development includes planning for the development of concepts, skills and attitudes. Since the appropriateness of the instructional material can not be decided by curriculum planners, "this leaves the teacher relatively free to select specific activities

appropriate to the development of individual children" (Goodlad, 1963, p. 322). These activities require a great deal of preparation time if teachers are to plan appropriate programs to address various student needs. High class enrollment makes selection of appropriate student material a difficult, costly and time consuming venture.

Local school districts may use committees of teachers, administrators, and specialists for the development of curriculum guides. Publishers may use curriculum resource guides to determine what should go into their resources (Goodlad, 1963). These resources have, by their very nature, a general appropriateness to a majority of teachers as a basic resource but are not suitable to every student in a particular community.

The need for applicable rather than recommended instructional material requires some teachers to modify instructional materials for their students. Modifying any amount of data makes great demands on a teacher's time.

The computer's ability to store, retrieve and modify data could greatly reduce teacher preparation time. The teacher's need for appropriate material that can be quickly modified could be met if easily modifiable information was provided on a computer disk.

Computer Influences

Much of the current use of computers involves programming, word processing and database applications. Current software programs have helped teachers to improve student motivation in learning repetitive, tedious skills and necessary basic knowledge.

When choosing an appropriate software program, the teacher's instructional goals determine the range of student activities. Instructional outcomes from a student activity are influenced by the goals and tasks which are included and omitted in the computer program (Anderson, 1982; Nievergelt, Ventura, and Hinterberger, 1986; Riding, 1984). If teachers cannot insert or delete appropriate tasks from a computerized program, they may judge the program as unsuitable.

The computer offers editing and graphic capabilities to modify information already digitized. Simple desktop publishing techniques can be used to modify some computerized resource material into appropriate student material (Anderson, 1982; Riding, 1984; Songleist, 1982; Watt, 1982).

Generally, instructional software may be categorized as "supplements to textbooks, curriculum integrated packages, generic or utility programs and 'stand-alone' materials" (Ehman and Glen, 1987; Smiddie, 1990). Supplementary software provides textbook support because it is often coordinated with specific texts. Curriculum integrated packages

which manage instruction and maintain student records, are used for drill-and-practice. Generic or utility programs may serve as classroom management and instructional tools. Graphic programs can produce visual aids, classroom materials or awards and certificates (Smiddie, 1990).

Hyper media is another category of software. An example, HyperCard consists of stacks of cards, with links between cards and stacks (Parker, 1992). With easy access and modification of stacks, teachers can design more appropriate instructional programs for students to use on the computer.

Database programs help procure and manage information. These programs can have full text, bibliographical information, and work with statistical formats stored in its banks (Carpenter, 1992). This type of program can help a teacher plan an informed approach to content. An organized collection of related information can be sorted, selected, displayed and printed in many forms such as lists, tables and charts which can be easily updated, changed, organized, selected, displayed, calculated, or corrected (Riggs, 1988).

Mediated learning systems incorporates sophisticated management systems, allows easier customization and offers rich video content. Its vast diversified content is stored on compact disks (Cummings, 1992).

Becker (1984) found that CAI (Computer Assisted Instruction) was popular among experienced computer teachers but tool applications such as word processing were used more frequently by inexperienced computer teachers (Ragsdale, 1991). Teachers may wish to modify existing CAI material. In the past this was impossible for most teachers. Today, however, CAI material developed in *HyperCard* or *Authorware Professional* can be more easily edited.

Application software such as wordprocessing, database, spreadsheet and draw/paint programs can provide numerical, textual and graphic flexibility. Some programs can be used to design a collection of analytical data on student performance (Mayer, 1982; Watt, 1982). Other programs give teachers an opportunity to collect background information for unit planning by searching a computerized library system such as ERIC (Hunter, 1982; Watt, 1982). However, this material may not contain instructional and planning material in digitized form. Inputting this material into a computer requires additional time for teachers so they may choose to use printed versions.

Computer technology offers both advantages and disadvantages when compared to printed instructional material. Computer databases greatly reduce the storage space now taken by instructional material and speed up access time. Since a computer is limited by the size of its monitor screen, printed curriculum materials can present large amounts of choice

information in a more flexible, readable form (Nievergelt, Ventura, and Hinterberger, 1986). If a teacher needs specific material copied for classroom use, it would be easier and faster to photocopy a printed master than to locate computer equipment, the appropriate file and then to print out the master.

Time constraints come into play when one is trying to find suitable information on a computer. If the information base is specific and small in size, the performance of the computer is quick. However, if the information base is large, the computer does require more processing time. During a search process, the computer does not display any information until the search is complete. By contrast, searching through printed instructional material offers the possibility of stumbling upon useful information.

Some existing electronic encyclopedias have addressed the benefits of print and increased computer speed by including options for printouts and faster searches in their software programs.

Another benefit of computer searches is the flexible accessing of resources. Teachers could access the instructional resources of a local school jurisdiction at any time. The cost of travel to a specific location for pickup or delivery could be reduced. Twenty-four hour access would offer flexibility in the time teachers choose for their instructional planning (Nievergelt, Ventura, and Hinterberger, 1986).

Some instructional planning software prototypes may not offer manipulation of instructional material. Source codes, conversions and other security measures within the disk make it difficult for even a knowledgeable teacher to modify any program lines. The reason for this is that the author and publisher wish to retain ownership of their ideas. Because of this practice, teachers are prohibited from adapting and modifying information or ideas. Teachers may not foresee any personal use for these prepared instructional packages, and, therefore, not use them.

Teachers currently use other modification methods such as cutting, pasting and photocopying. Torrance (1970) and Riding (1984) agree that modification is a kind of creative productive thinking. Some tests of creativity are: does it create a new combination, use, or expression of what is known? (Riding, 1984) or is there a degree of novelty value in the product? (Torrance, 1970).

Implications from the Literature for this Study

If a teacher is looking for developed instructional material to individualize student learning, the computer offers the advantages of time-flexibility and easy modification,

storage and retrieval of instructional material. The development of the resource disk for use in this study was based on the following considerations.

First, the researcher had to offer instructional resource material on a computer disk to save input time. Second, the researcher had to include a listing of content and text files in a printed index for easy location and retrieval. The resource material had to provide modifiable instructional resources that could be quickly and easily loaded into a word processing program for modification. Third, the computer processes and equipment required to use the resource disk concept had to be easy to learn, and fourth, the software processes had to be easy to understand and use.

Learning about computer technology should begin with the teachers. If teacher uses were demonstrated, teachers might value the computer processes and be able to develop a greater understanding of computer technology. This understanding could enhance their explanations of computer technology to their students.

Consideration must be given to effectiveness when deciding on whether to read print material or a computer screen. Trautman (1992) states that reading, writing, and digitizing are active endeavours to compose meaning. The act of digitizing material by itself creates very little meaning, just as reading a single word from a text or writing a single word in a printed composition are not, in themselves, representative of meaning. However, writing, revising and editing of compositions for a purpose gives meaning to the whole. Provision of a computer application, instructional training and a collection of varied resources for curriculum development, may demonstrate a use for the computer in social studies instruction.

The need for printed materials is supported by the existence of the photocopier machine in schools (Ehman and Glenn, 1987). Cooperative learning/teaching favours the use of print material over computer programmed instruction because it is easier for all involved to use, share and manipulate (Olds, 1988, cited by Hunt and Alford, 1991; Johnson and Johnson, 1989, cited by Hunt and Alford, 1991). Therefore, generating print material would have practical value to a teacher's planning for instructional material.

At the elementary school level, teachers often use an integrated theme approach. Therefore, instructional materials must be easy to update, change, correct, organize, select, display, calculate, and total (Riggs, 1988). The instructional material must offer opportunities for modification based on individual teacher and student differences (Ehman and Glenn, 1987).

Saving teacher time is the greatest factor to be considered in assessing the creative and modifiable components of instructional material. With laser disk storage capabilities,

management features and customization possibilities, the storage of instructional material could be increased (Cummings, 1992).

The use of telecommunications is another way by which curriculum resources could be made available to teachers (Carpenter, 1992). The resource bulletin board could be accessed and materials down-loaded on a 24-hour basis. However, considering the expense of a modem and software and the time required to learn another process, perhaps an instructional materials disk compatible with any word processing program could be offered.

Lincoln and Guba (1985) claimed that teachers could share their experience in teaching and computers more effectively when coaching is a part of their everyday experience (cited by Ragsdale, 1991). The coaching method would have to include personalized instructional resources to meet the teachers' needs. Ragsdale (1991) also states that the introduction of any new tool to teachers must include a minimum of training in its use and a focus on making instructional material.

Thus, the resulting resources provided by the computer will not just supplement existing texts but will offer opportunities for creativity, allow for modification and facilitate the development of instructional material. The resource material provided must be content based, well organized, and clearly presented as well as offering the teacher choices in student activities.

CHAPTER 3

METHODOLOGY

This chapter is divided into four major sections, the development of the resource disk, the sample, the teachers' approach to the construction of material, and data collection and analysis.

Development of the Resource Disk Concept

The Macintosh computer was chosen for its easy-to-learn environment. The analogy of a file cabinet containing folders which contained files (or even other folders) was used to explain the Macintosh operating system to the teachers.

The choice of Microsoft Works (MsWorks) Version 2.00a was primarily based on how easily it allowed the use of graphic tools without disrupting the presentation of the displayed or printed material. Text and graphics can be locked together for final presentation. Later editing does not disrupt the coordination of graphics with its corresponding text. The researcher's familiarity with the application also contributed to its selection.

The procedures used by MsWorks are analogous to the tools that teachers presently use in their preparation of instructional material; scissors for cutting, glue for pasting, white-out for mistakes, deletions and photocopiers for articles, pictures or graphics.

Coaching was chosen as one of the resource disks' implementation strategies to encourage the exchange of computer understandings in a supportive one-on-one environment between teacher and researcher. A coach familiar with instructional preparation and computer procedures offered expertise and curricular support to the teacher.

Instructional Material Preparation

The resource disk material was developed to help the teacher with instructional planning. The purpose of the resource disk was to provide instructional material that was easily modifiable, modifying material on the computer would decrease preparation time and provide instructional materials applicable to student needs.

The instructional material was offered on a computer disk to Grade four social studies teachers for Topic B: Alberta: Its People in History. The disk contained objectives

and goals from the Alberta Program of Studies (1989).

Teacher resources were placed in level one of the resource disk. In level two, content materials were included. Figures 1 and 2, show the organization of these two different levels of the resource disk.

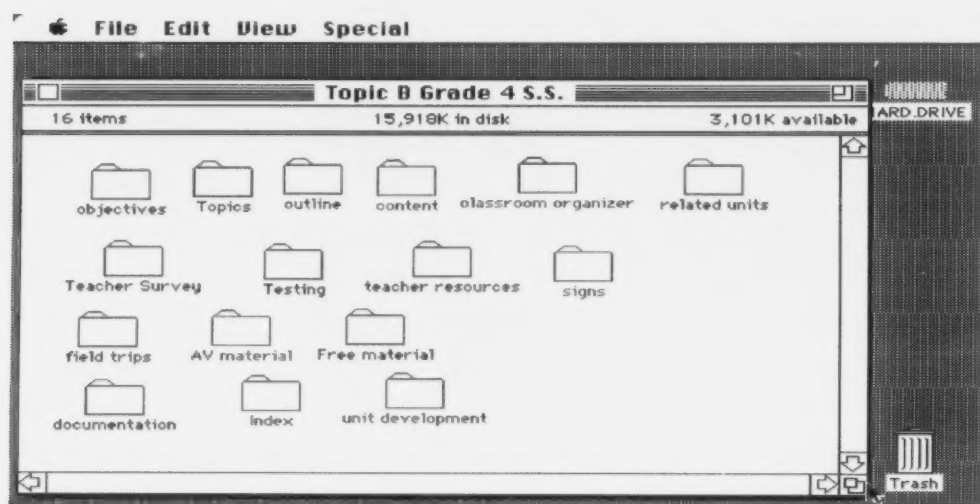


Figure 1. Teacher resources (level one)

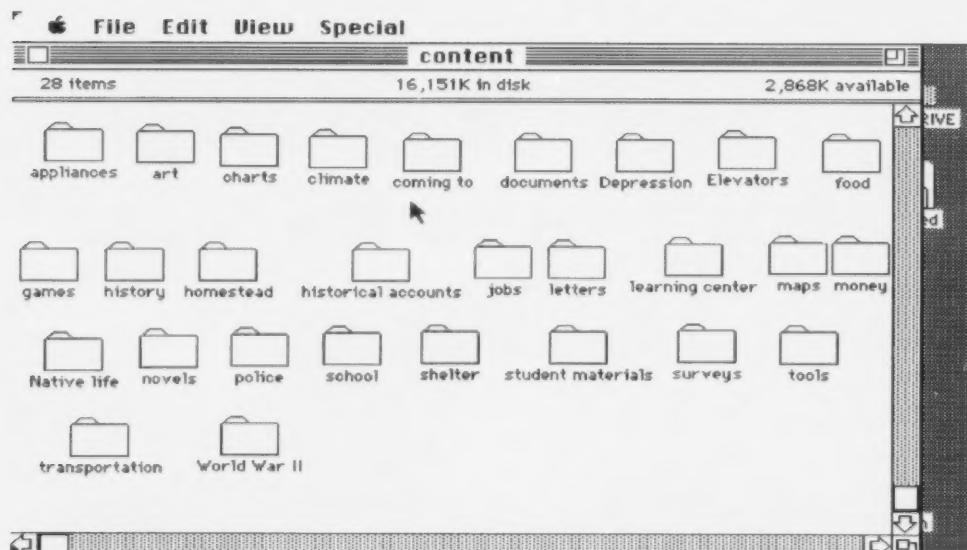


Figure 2. Instructional content material (level two)

Technical documentation and the index were provided on the resource disk and in print form.

The files listed in the index are designated by a "T" or "S", indicating whether they are teacher applicable or student applicable. Abbreviations "Txt" or "G" are used to denote whether it was a text file or a graphic.

Most of the instructional material was developed by the researcher. However, some resource material from the Edmonton Public School Board and Alberta Education was used with their permission. Footnote credit was given at the bottom of these documents.

Piloting of the Resource Disk

The piloting of the Macintosh environment, the MsWorks program, and the resource disk's social studies information were tested by means of presentation to two groups.

A demonstration was given to a university class of undergraduate education students, trained in computer use. They were asked for their reaction to the above choices. The university students wished to have a copy of the resource disk material to add to their own existing files. They mentioned that the organization of the disk provided an organization for their instructional units. Having access to the Alberta Education topic objectives would save them time validating their choices of instructional material. They realized that all this material could be easily adapted to suit the student needs they would encounter. When asked their opinion as to whether other teachers would also want this material, all of the undergraduate education students responded affirmatively.

A subsequent presentation to Grade 4 social studies teachers was made in order to validate the usefulness of the resource disk information for teachers' instructional planning. After the presentation all fifteen teachers wished to have a copy of the disk as soon as possible. One teacher had even brought a disk to the presentation so that he could have his copy immediately. All of the teachers recognized the need for material which could be adapted for students. The organization of instructional material was useful for them and they were particularly interested in the resource disk outlines showing the development of a unit. When asked their opinion as to whether other teachers would also want this material, all of these teachers responded affirmatively.

Sample

Participants for the next phase of the study were chosen on the basis of their

1. willingness to participate in the three succeeding sessions on unit development,
2. facility with the Macintosh,
3. expressed willingness to actually make their own adaptation and modifications to material provided on a disk, and
4. willingness to attend the construction sessions and to be interviewed.

At the end of the teacher presentation, volunteers were solicited to participate in three additional sessions lasting one and one half hours each. Two Grade four social studies teachers volunteered. They differed in both their teaching and computer experience. Teacher one, given the pseudonym Mrs. Mac, had nine years of teaching experience. At the time of this study she was teaching a Grade four/five class in a kindergarten to Grade six elementary school in a large school district. Mrs. Mac had access to a Macintosh SE in the school office. During the course of individual sessions, she was impressed by the capabilities of the Macintosh computer and the templating process, and therefore, decided to immediately place an order for her own Macintosh portable computer. She was familiar with the Apple IIe and gs. Her secretarial experience prior to teaching resulted in competent keyboarding skills.

The second teacher, given the pseudonym Mrs. Tosh, was in her first year of teaching. She was teaching a Grade four class in a kindergarten to Grade six elementary school in the same school district. Her school did not have a Macintosh computer, but the staff was considering the purchase of a computer for teacher use. Mrs. Tosh had taken a word processing course in university on the Macintosh computer, and owned a Mac Plus with a double disk drive. Her knowledge of computer application terms and programs was considerable. She had also worked as a secretary using Microsoft Word.

Teachers' Approaches to Construction Sessions

The construction sessions were designed to give the teachers the opportunity to construct some personal instructional material using the resource disk templates and processes to create their own new material.

The researcher planned three sessions for the teacher participants to learn the following concepts and procedures: the organizational structure of the resource disk, storage and retrieval procedures, template construction, scrapbook use, and the MsWorks

program.

The first session began with an introduction and tour of the resource disk. Session two included modification and adaptation of some specific information obtained from the resource disk. Some creation of graphics was done using the SuperPaint program. The modification of a templated worksheet was done in MsWorks. Modification used editing features such as cutting and pasting, deletion, and the use of the graphic capabilities of MsWorks. In session three, the two teachers constructed a template of their own. Thus, the teachers applied their understanding of the organizational structure of the resource disk, storage and retrieval procedures, template construction, scrapbook use, and the MsWorks program.

During each of the individual teacher sessions, the researcher/coach suggested that the teachers work on something they could use in the classroom. Thus, teachers had the opportunity to prepare instructional material for immediate use.

The researcher brought a Macintosh SE with a twenty MB hard drive and a 1.44 floppy drive to each session. The printer used was a Hewlett Packard Inkjet.

Data Collection and Analysis

The documents created and used by the teachers were collected. With the teachers' permission, each session was audio taped and later transcribed. Observational notes were written by the researcher after the sessions. As a follow up to this study, a telephone interview with each teacher was recorded one year later.

Transcripts of the individual construction sessions were later analyzed to determine teachers' reactions to the material and processes and to determine the kind of material these teachers chose to adapt in their development of instructional material. A second reader read the transcripts to check the interpretation of the researcher and to check for any major points missed by the researcher.

Questions posed during the telephone interviews one year later were based on the themes which emerged from analysis of the construction sessions.

Summary of Chapter Three

The researcher developed a resource disk for Grade four social studies teachers using MsWorks and the Macintosh computer. The disk contained two levels, a teachers' resource level and an instructional content level. This disk was presented to undergraduate

education students and a group of Grade four social studies teachers for feedback on its usefulness. Two teachers volunteered to participate in subsequent individual coaching sessions using material on the resource disk to design their own instructional material.

CHAPTER 4

OBSERVATIONS AND FINDINGS

The individual teacher sessions are described followed by a synthesis of their reactions and a follow-up interview one year after the construction sessions. Finally, a summary of this chapter is presented.

The two teachers used the researcher's personal computer for these sessions. Each teacher opened areas of the resource disk that she wanted to view. While the teachers looked at the files and constructed their instructional material, the researcher and the teachers carried on a dialogue and discussed how to approach the construction of material.

A Description of Mrs. Mac's Sessions

Mrs. Mac's inexperience with Macintosh word processing programs necessitated three sessions on the computer. She had good keyboarding skills from previous secretarial experience.

Session One

Mrs. Mac arrived at the school board computer room with her planning binder. She looked at the social studies "objectives" and the "outline" folders on the resource disk. She wanted to view some of these folders and to work on the outline she had in her planning binder. First, she wanted to view the Alberta Education objectives and make a printed copy of them. Next, she previewed the "outline" folders and chose "coming to Alberta," then "natives" and "history" where she studied the time-lines.

She was impressed with the hard-drive on the computer because it gave quicker access to the different files as compared to the constant disk switching on the Apple IIe at school. She was considering placing an order for a portable Macintosh computer. She asked about the printer (Hewlett Packard Inkjet) and the kind of copies it made because she was deciding whether to choose an Imagewriter or a better quality printer.

Mrs. Mac typed her own outline using her own resource material in the binder she had brought to the session. She typed the titles, "Student Text," "Teacher Text" and "Resources." Using the word processor she typed the outline titles from the "outline" and "objective" folders of the resource disk. From the objective folder she typed "Special

Communities" (Topic 3B social studies), and from the teacher developed outlines, she typed "Coming to Alberta" and "Native culture" on her outline plan.

Mrs. Mac experimented with her outline using font, style, size, and grey textures in the format feature of MsWorks. She changed the print size and fonts and viewed them on the screen. Mrs. Mac used the spell option to check her work. She then saved her document as a "Social Studies Outline" onto her disk, so that she could transfer it to her portable computer when it arrived. She printed her draft outline to see what it looked like.

Mrs. Mac wanted to construct some instructional material for her classroom. The researcher guided her as she transferred a map from the "graphics" file into SuperPaint, enlarged the map and constructed her variation of the map to use in class the next day. The researcher explained that she could take the SuperPaint graphic to MsWorks using the scrapbook since MsWorks would not accept graphic file forms that were not compatible with its own format. She questioned this procedure until she understood the reasons for this process. She understood how large to make the enlargement settings because the SuperPaint program responded that the graphic would become too large to display on the screen. Using a map of Canada on the resource disk, she proceeded to make her own map of Quebec in SuperPaint (Appendix B).

As she pasted her map into the scrapbook for MsWorks, Mrs. Mac began to see the instructional possibilities for the scrapbook. After learning how to move in the scrapbook, she proceeded to browse through the researcher's scrapbook. She now understood how the cut and paste feature worked in the scrapbook.

Mrs. Mac loaded the MsWorks program and proceeded to make questions for her students. After placing a blank for "student name" and the title "legends" on her Quebec map, she cut and pasted boxes for her legend. She then printed out a copy of her Quebec map.

Mrs. Mac used the preview function before printing her map. She realized how this existing map could be pasted onto new document pages in MsWorks to create various kinds of maps such as political, economic, or geographical. Mrs. Mac indicated that she was planning to bring more mapping ideas to the next session.

Mrs. Mac phoned to change our next session due to a school event. She wanted to continue to make more instructional material at the next session. She had not used her Quebec map from the first session because she wanted to make more editorial changes.

Session Two

Session two was moved to Mrs. Mac's school where the researcher set up the computer equipment in her classroom. This was more convenient for the teacher. Before the session began, she showed some instructional material she had sketched and wanted to prepare for the next day.

First, she wanted a printed copy from the "related unit plans" folder of the resource disk. She wanted to look at the outlines later to see if they were of any use to her. Mrs. Mac commented that she preferred outline plans because they kept her teaching on track. She viewed the resource disk outlines and said she could modify these outlines to suit her needs.

Next, she reused her Quebec map (Appendix B) to make three separate documents by using the "save as" feature and renaming the new files. Using a Quebec pamphlet from her personal files, Mrs. Mac typed some questions on each map. She retrieved her first session's map from her resource disk file and constructed her own map of Alberta using MsWorks graphics. Finally, she printed her maps of Alberta and Quebec.

Mrs. Mac then drew a human shape on which she wanted the students to write the French words for the body parts (Appendix B). She now understood how to switch from text to graphic mode in MsWorks. She had a little problem understanding how to create space within the text with "returns" before placing the graphics in the text. Mrs. Mac found that the beginning of a document should be defined by returns so that the graphic could be moved further down on the screen for balance on the page.

Mrs. Mac began to ask about the MsWorks graphic tools before using them. She started experimenting with the graphic tools and found the multiple rubberband tool. With this tool she made the hands and legs of her outline man. She was quite thrilled to discover something new on her own.

Mrs. Mac drew a vertical and a horizontal box but was not pleased when she could not draw a diagonal box in MsWorks. She placed French and English words in the boxes (Appendix B). Mrs. Mac saved the box as a master file, her typed French/English words file and used the "save as" feature to make another new file.

She was so enthralled with the six pieces of instructional material she had made, that the session went overtime. She really wanted to finish the questions on the map of Quebec for the next day, which we did.

When she saw a "report card comments" folder on the researcher's hard drive, she realized that the computer could be used for another task performed by teachers. She

opened and previewed the folder which calculated students' marks on a spreadsheet. Mrs. Mac then wanted to use the computer to make her June report cards.

While helping to pack up the computer equipment she talked about returning the Imagewriter and buying an Inkjet printer. But she realized that her funds may not permit such an expensive, better-quality printer.

Mrs. Mac enjoyed constructing pictures on the computer. She enjoyed the computer because of its editing capabilities. The layering construction process in MsWorks reminded her of the process she had encountered when creating her water colour paintings.

Session Three

Mrs. Mac had asked about getting more Quebec material in session two. The researcher provided some IBM scanned images. She learned how to use the screen sizing box before she loaded the researcher's IBM Quebec documents into the Macintosh exchange program.

While using the exchange program, a viral scan appeared on the screen. It was explained to Mrs. Mac. She understood the importance of viral scanning and the problems she could encounter if infected programs invaded her hard-drive. The viral program checked the MacPaint program Mrs. Mac had purchased from another person.

Mrs. Mac asked about the disk drives on this machine. She also inquired about a five and a quarter inch disk drive and whether it was necessary to purchase one for her computer, as well as where she could get disks for her machine. The researcher gave her information about the drives and where she could purchase reliable disks.

Mrs. Mac began using some of the additional features that were available in MacPaint. She tried the three dimensional drawing icon, the patterns, the fills and the zoom in and out features. Then she ejected the disk.

Mrs. Mac wanted to experience copying a disk to the hard-drive. Here she found out that she could not copy a disk to a file folder. She wanted this experience to enable her to load the resource disk onto her hard-drive.

Next she viewed the scanned Quebec articles from the hard-drive. She began to look at the file folder names on the hard-drive and stopped at the "O'Canada" folder which contained the French version of "O'Canada." Later she viewed the contents of these files in the MsWorks program.

Mrs. Mac looked at the "class organizer" inside the "related unit" folder on the

resource disk. She opened the "awards," "signs," "seat planning" and "rules" folders.

Mrs. Mac opened other files such as the "name tags" folder. Here size of print was discussed. She found that the largest size of print in this environment was seventy-two points. She typed in three students' names and their name tags were printed out to show the size.

After looking at these files, she reopened the award master in MsWorks. From a template on the resource disk, Mrs. Mac designed a June award sheet for her class.

A month after the sessions, Mrs. Mac consulted the researcher by telephone to find a program which would make report cards. Programs were discussed. She told of how her staff had become interested in the things she had produced on her computer. She had made some banners for other teachers and had used her portable Macintosh to record the staff meeting minutes.

A Description of Mrs. Tosh's Sessions

Mrs. Tosh's previous computer experience made it possible to complete the coaching in two sessions. She was not familiar with the graphics component of MsWorks and wanted to use it.

Session One

For her convenience, the researcher set up the computer equipment in the back of her classroom. Mrs. Tosh began previewing the social studies topic B folder on the resource disk.

She looked at the "content" folder where the instructional material was stored. She previewed the "classroom organizer" folder in the "related units" folder, opened the files under "awards" folder and looked at the "awards" templates. The researcher explained the differences between SuperPaint and MsWorks programs. The way MsWorks superimposes text over or under the graphics was demonstrated while Mrs. Tosh worked on the computer. The analogy between this process and using an overhead transparency and a photocopier was discussed. If a picture was photocopied onto a transparency and placed over top of a typed page, the picture and text could be consolidated by the photocopying process onto one sheet of paper. Mrs. Tosh stated she had used the same procedure with two pieces of paper, when she cut out a picture, taped the picture onto a typed page and photocopied it.

Mrs. Tosh looked at the graphics in MsWorks and wondered if some graphics were drawn freehand. The researcher confirmed that most of the graphics were indeed freehand drawings. She mentioned that drawing would have taken a great deal of work and that she preferred to modify ready-made pictures on her computer rather than do an actual drawing. She was astonished when a graphic of a pig was made to disappear from the "award" template by using the delete key rather than using the erase tool.

After she knew how the graphics were cut and pasted, Mrs. Tosh went on to look at the "horizontal card" template in the award folder inside the "classroom organizer" folder. She noticed the differences in the printed characters and wanted to know if the printer could print in different colours. She inquired about the function of the extra keys on the extended keyboard. She had noticed that the tools written on the extended keyboard did not work in the MsWorks program. The researcher explained that the extended keys could be used in computer programs which permitted their use.

The award was printed out to show the size of the largest print, seventy-two points. Mrs. Tosh mentioned that she had seen other programs print it much larger.

Next, Mrs. Tosh switched to the "title page" template folder under the classroom organizer. She was hoping that there would be graphics in the folder she could use for her title pages. Mrs. Tosh developed the text for the title pages "winds and convection," "heat and temperature" and "mystery solids." She previewed the fill designs for the frame from the resource disk template "title pages." She looked at the animal graphics which were on the scrapbook. Mrs. Tosh did not find any graphics which she could manipulate for her title pages.

When asked to construct some instructional material, Mrs. Tosh felt reluctant until she was persuaded to do so. At Mrs. Tosh's request, the researcher started a picture of a windmill. She finished the windmill after one blade had been drawn by the researcher. She was excited after developing the picture of the windmill. She began to use shapes which could be modified to produce an outline drawing of the things she needed. Mrs. Tosh learned how to group the blades of the windmill to keep them together on her picture. Next she completed her graphics for "winds and convection," "heat and temperature" and "mystery solids" title pages (Appendix C).

Mrs. Tosh wondered if SuperPaint performed better than MsWorks and how you would transfer a picture from SuperPaint into MsWorks. The researcher answered that the scrapbook would accomplish her goal.

While putting away the equipment she discussed a hard-drive purchase with her husband who had arrived. Mrs. Tosh wanted a hard-drive to facilitate her work at home

and make her MacPlus more efficient.

Session Two

This session also took place in Mrs. Tosh's classroom. When she was asked what she would like to do, she wondered if there were maps on social studies topic B. She clicked on the topic B folder and went to the "content" folder. She chose a map of Canada from the "maps" folder. Mrs. Tosh listened to the researcher's description of how the map would fit on the page. While loading the map of Canada, she noticed how much easier it was to load files and programs using the hard-drive on the researcher's computer compared to using her MacPlus computer with a single disk drive.

Mrs. Tosh expressed interest in graphic files. Clip art files were discussed, and Mrs. Tosh asked where she could purchase them. She looked at the "map" folder and began to scan the files to see what was there. She viewed the maps in SuperPaint.

The Macintosh scrapbook was discussed next. Although she was familiar with the Macintosh environment, Mrs. Tosh was impressed with the scrapbook function and what it could do. The difference between the clipboard and the scrapbook was mentioned, using the analogy between a real clipboard and a real scrapbook. Mrs. Tosh realized the disadvantage of the clipboard holding only one sheet of paper. However, she was impressed to learn that the scrapbook could hold several sheets, which she considered to be a real advantage.

Mrs. Tosh spent some time experimenting with the features of SuperPaint. Using the map of Canada she had loaded, Mrs. Tosh proceeded to erase the provinces she wouldn't be using for the lesson she was planning. Mrs. Tosh saved the resulting map of the prairie provinces (Appendix C). Next, she opened the "map" folder and used a map of Alberta on which she drew the Cordillera Mountains (Appendix C).

Mrs. Tosh began another map by pasting the map of Canada on a new document (Appendix C). She had learned how a single drawing could generate multiple instructional materials. She went back to the first document to add more detail to her first map of the prairie provinces. Mrs. Tosh magnified the map in SuperPaint. She experimented with two hundred times, three hundred times and four hundred times magnification and saw what happened. She chose two hundred times magnification.

Mrs. Tosh wanted to know what else the researcher had in the resource disk files. She asked if there were any templates on reporting of marks as she had seen the report card file name on the hard-drive. She wondered how report cards could be done in MsWorks.

Mrs. Tosh looked at and asked questions about the comment template and the spreadsheet masters she was viewing in the report card file. This report card file had been newly created by the researcher.

Synthesis of Reactions

Reactions and themes which emerged from the construction sessions with Mrs. Mac and Mrs. Tosh seem to relate to current instructional needs, construction processes, coaching, resource disk contents and technology. Since there is considerable overlap among these reactions, no attempt will be made to isolate them under separate sub-headings.

Analysis of the taped transcripts revealed that the teachers were concerned with current instructional needs. The two teachers were interested in planning for their present instruction. Mrs. Mac wanted instructional material on Quebec for a unit plan she was developing with another teacher in her school. Mrs. Mac expressed an interest in having a copy of the objectives from Alberta Education's Topic C on Quebec. She did not have any personal instructional material for that topic and she wanted to develop some material. Mrs. Mac wondered if the researcher had any computerized instructional material on this topic. She wanted the instructional material to be appropriate for her grade level, since she did not have time to prepare new instructional material for the current school year. After balancing the Quebec map in the middle of the text she had created, Mrs. Mac stated, "OK. I got it right away!" The thing that seemed to impress her the most was the product she had created. She said, "Yah! Yah! It's wonderful! Gee, my kids will be really impressed with this." She kept looking at her printed map of Quebec.

Mrs. Tosh wanted a copy of the resource disk's diploma award for a June Awards Ceremony. Mrs. Tosh wanted instructional material which she could modify for her needs. She was interested in how the material was organized on the resource disk since she had experienced difficulty locating her files on a computer disk. She wanted hard-copies of the scrapbooks to enhance her student material.

A comment that sums up teachers' emphasis on current needs in the classroom came from Mrs. Mac, when she said, "Yes, that will be so much easier. OK. Perfect. I have something for tomorrow—like real art paper!" She enjoyed making personal instructional materials suitable for her students' abilities. She liked the possibility of modifying instructional material for specific student's needs.

While Mrs. Tosh was looking at the graphics that the researcher had drawn, she

stated, "Well, did somebody actually do this by freehand?" She recognized the differences in tonal quality between commercial pictures and freehand outline pictures on the computer screen. Her interest in graphics is summed up by, "Where did you get the clip art from? Where can you buy a thing of clip art?" Her questions suggest a strong, immediate need for this type of material.

When Mrs. Tosh began the construction sessions, she immediately started to create her own file of instructional material. After she had finished she said, "This is going to be perfect. I'm excited 'cause I need to be able to do this." She was referring to the process of creating instructional material of her own.

When she came to the conclusion that she could construct something from the resource disk, she stated

I can actually build a cordillera line out of that. So now I would be in free hand... is that right?... So I would draw in my own lines?

and she proceeded to select the graphic function in MsWorks that allowed her to draw her map.

Mrs. Mac enjoyed the opportunity to choose what she needed for her instructional material sheet. Mrs. Tosh described the opportunity to choose when she said, "You can change it right to...and fool around with it and decide for yourself." Mrs. Tosh felt that the opportunity for personal selection was important, too.

Mrs. Mac's curriculum planning consisted of a list of resources. She kept a personal outline in her plan book to keep her on track.

Before building new instructional material, Mrs. Mac felt it was necessary to list all the materials she had. When Mrs. Tosh was asked to make instructional material, she decided to make three title pages (Appendix C). She wanted to make these because it was an important organizing element in her teaching. She explained:

And so we start off with the title page...and then they go through...and for each thing they get...they just keep adding on and adding on.

She explained further:

So what I was hoping...what I started them off with, was what I have on my program—some sort of a format for the different experiments that I do.

She wished to supplement the text material she had previously made with the new material she was developing on her computer.

Both teachers were amazed at the uses of the MsWorks program. They were interested in how to move graphics and textual information from printed sources and from other programs. They expressed how practical the MsWorks program features were in

making instructional resources. Mrs. Tosh stated: "I would never give up my MsWorks for all the other things I want to do."

Neither teacher had used the Macintosh scrapbook feature because they weren't aware of its possibilities. Mrs. Tosh stated this clearly in session two, "But I've never used a scrapbook before!"

Both teachers were interested in using the computer program in the construction of their report cards. At the end of the second lesson, a report card template was previewed while using the spreadsheet portion of the MsWorks program. Their understanding of templates and transporting documents in the scrapbook was demonstrated in a discussion about creating a report card folder. Both teachers understood that the editing features of cutting and pasting from the scrapbook could create a good report card format. They understood that a properly set-up template, such as "comments," would speed up their report card writing process.

Mrs. Tosh was interested in the drawing features in a word processing program. She looked at the researcher's pictures on the resource disk. She had previously thought text and drawing procedures were not available together.

The researcher observed that the two teachers had adequate keyboarding skills. However, understanding of word processing and how an application program works confused Mrs. Mac. She knew how to change the capital letters by using the keyboard but did not know many procedures for formatting. She found the spacial relation between the screen and the placement of the mouse on the pad confusing, especially in relation to the movement of the mouse.

Mrs. Mac enjoyed creating on the computer. She thought the MsWorks program duplicated water colour painting by using a wash underneath a drawing.

Mrs. Mac expressed her growing understanding of the relationship between the size of print on the computer screen and what it could be on the printed page after she had created a map of Quebec. She saw the graphic change size but she was unsure as to what size the graphic would be when printed. She wanted to move down to the bottom of the page on the screen.

Despite her growing ability to bring different program documents (text and graphics) into and out of the scrapbook, Mrs. Mac had trouble believing that reusing what was stored on the clipboard would be beneficial. After her experiences with the scrapbook she stated, "So the scrapbook is what you really use to go in between the programs. OK. OK. I'll have to remember that!!"

Mrs. Tosh's previous computer training gave her a reasonable level of competency

in using a word processing program. While using graphics and text, she faced the problem of how to place both in the same space. Mrs. Tosh used the preview feature to make certain it looked the way she had visualized it. When she was using MsWorks she asked how she could make the graphic smaller. The researcher explained how the dots on the corner can be used to reduce the graphic size.

When Mrs. Tosh was asked about whether she was willing to make drawings, she answered:

Well, I'm sort of...I'd probably be about the middle. I like taking the list and changing it around and moving it. Once I have even the owl picture, for instance, I could see the little things I could do just to adapt it...put something in his hand or something.

Mrs. Tosh disclosed the reason for her reluctance to create a drawing when she stated, "I have tried and it is embarrassing...like it is just worthless for me." However, she thought the possibility of manipulation and adaptation would be feasible for her. She was still reluctant to try to draw something because she felt that she could not draw well enough.

Mrs. Tosh did agree to construct a title page when she found out there weren't any suitable graphics in the resource disk. But while she was building the arms on the windmill, Mrs. Tosh commented that she couldn't draw well. When she found she could copy pieces of her own drawings and could eventually improve them at a later date, her confidence grew.

Mrs. Tosh was beginning to understand how MsWorks treated the text and graphics. She observed the effect on a picture, when she began typing over a graphic she had imported into MsWorks. She perceived the enlargement or reduction as adaptation.

Mrs. Tosh felt that she was more interested in how to store and retrieve graphics to be used in the development of her instructional material. Initially, she had not visualized the screen size in relation to a printed copy of the page. Mrs. Tosh clarified this when she printed out her award: "That is an interesting thing. I didn't realize that a screen is one quarter of a page."

Both teachers found it necessary to check with the researcher for what to do next when they had problems. Mrs. Mac asked questions such as, "Now, where do we want to go?"

Mrs. Tosh asked "Why didn't it move to the box?" when she tried to move a graphic. She realized later that she had forgotten to select it as she had done in word processing because the object on the screen didn't have the selection squares showing.

Mrs. Tosh discovered a different way of starting a new document when she tried to delete a previous line in a drawing. Deletion did not work because she had previously used

the control-G keystroke to lock the unwanted line to the drawing. She decided to make a new page by using the original graphic still unchanged in the scrapbook.

Teachers need to understand construction processes, templating, planning and data storage in order to use the resource disk successfully.

Mrs. Mac felt that she would use MsWorks for her drawing because she did not see the advantage of buying another graphic program.

Mrs. Mac did not understand the need to save a file on disk in order to save time in bringing it back for future construction. She had realized that the storage on the hard-drive would provide easier access.

Mrs. Mac was worried about the effort it took to build the amount of material she was observing. She wondered if the resource disk could be transferred to her computer.

The teachers' modifications depended upon the opportunity to choose a promising document from a file on the resource disk. A comment made by Mrs. Tosh supports this: "You can change it right to...and fool around with it and decide for yourself." Mrs. Mac was really enthusiastic about using the word processing procedures because, as she put it, "This is the other thing you do by hand. You have to redo everything again because it is not the way you want it."

Mrs. Mac understood the construction process and the text/graphic relationship rather quickly due to her experience in water-colour painting. Several times she reminded herself out loud of this.

Neither teacher had problems using or understanding the scrapbook once it was related to a real-life scrapbook or photo album.

Mrs. Mac wanted to see a printed copy. She said: "So that is what it is like when I print it out. Sometimes I have to look at it." The need for a printed copy was recognized by Nievergelt, Ventura, and Hinterberger (1986). Both teachers were shown the preview selection in the MsWorks printing menu, but they still preferred to see a printed copy.

Mrs. Tosh wanted to use the large print for classroom displays. While Mrs. Mac was editing she asked after she finished a labourious process, "Could I have done it any other way? Is there a faster way?"

Mrs. Mac asked "Oh, how do we do that?" several times during the templating process. She had ideas of what her instructional material should look like and she asked questions to find out how to make it on the computer. While involved in her templating session, Mrs. Mac described her view of her computer skill level as "I am getting a little better. I even forgot one day to the next what it was we were doing." This statement indicated her desire to clarify in her mind, the manipulation of text and graphics that

computer processes could offer so she could create her envisioned instructional material.

Mrs. Mac stated when she was designing a class list from the template that she could save a great deal of construction time. She understood how to use the drawing programs and about designing and modifying clip art graphics in SuperPaint and storing them in the scrapbook. These graphics could be stored on a disk and used for constructing instructional material in other subject areas. She asked where she could get commercial graphics. Mrs. Tosh seemed to understand templating when she said, "if you wanted to...could you copy this and you know if you are doing something repetitive, could I go boom, boom, boom?" However, she was hesitant about how to bring new graphics into the template. In modifying a template graphic, she wanted confirmation of which computer process to use.

A further organization of graphics was perceived by Mrs. Tosh when she asked, "Why can't you just collect it,...and make a sample file and keep it on your drive?" She wanted graphics at her finger tips in the word processing program. She was not concerned about the portability problem, especially if she had the graphics available in one program like MsWorks. Her understanding of the scrapbook, instructional templates and graphic portability problems, showed tremendous growth from her first experiences with the researcher.

Mrs. Mac felt that the computer could be useful for constructing unit plans for her subjects. Her first consideration was being able to outline the teacher's instructional materials. She stated:

There's my science, so what I need to do today is I want to break down my social studies right, unit by unit, and set out exactly what we are going to be studying. Now what are we going to be studying for next year's long range plans for language arts are...

Her method of unit planning is expressed by the following comment:

OK. We'll set up what...the overall plan and expectations and goals would be. How does that sound? From there we can break it down into units if we get that far.

Another important factor in her planning is the final presentation of the instructional material. Mrs. Mac wanted poster-making capabilities which would be easy to use and create professional-looking posters. She told a story about a teacher in her school who had made instructional posters with PrintShop. Mrs. Mac was pleasantly surprised that this templating process could give her results of equal quality and yet offer her increased

control over the creation of her posters.

Mrs. Tosh said her school used file folders to store teachers' instructional material. However, Mrs. Tosh stored hers in binders to facilitate easier retrieval. In discussion with the researcher, she stated that she found the binders to be more useful for instructional material because she was able to see what instructional material was available at a quick glance. The rings of the binders prevented the sheets from falling out of order. She connected the traditional filing system to the organization of the resource disk. She went on to discuss with the researcher how a teacher could handle all the data. Mrs. Tosh expressed a concern about the size of the data base when she said, "Is that as large as it gets?"

Mrs. Mac was pleased with the individual attention she received. She stated: "I mean this is great. I mean its easy to get everything organized." She felt this was a good training opportunity. When she discovered how the next graphic feature in the computer session worked, she replied, "...That's neat! That's great!"

When she began the construction sessions, she immediately started to create her own file of instructional material. After she had finished she said, "This is going to be perfect. I'm excited 'cause I need to be able to do this." She was referring to the process of creating instructional material on her own.

When Mrs. Tosh came to the conclusion that she could construct something based on the resource disk, and she proceeded to select the graphic function in MsWorks that allowed her to draw her map.

Both teachers several times gave appreciation for the immediate help which reduced the level of frustration when they encountered problems. The researcher noted that their questions became more exacting in scope and indicated growth in their understanding of the computer, its programs and how they worked together.

The reason Mrs. Mac liked the outline files on the resource disk was, as she put it, "That's good. That's perfect. I would like to find out which ones (files) are good for next year." Mrs. Mac made a list of instructional material she wanted according to the name of the file and where they were stored. The time of the school year influenced her decision regarding which instructional materials she needed. She chose the "Name Tag" template file, the "Seating Plan" template and the "Rules" template for next September. Why waste our time here? Right," Mrs. Mac said.

Mrs. Tosh was interested in obtaining the graphic materials to use with her instructional material. She looked in the scrapbook for graphics. She explained her experience with graphics files as:

I did get some clip art from another person but I can't seem to make it work within my program because I don't have a hard-drive. Is that a difficulty?

Mrs. Tosh summed up the information she saw on the resource disk as "What a lot of work!" She felt that graphics on instructional material would be useful to her. She answered the researcher's question regarding the resource disk's usefulness, as "...especially graphics and pictures and things. That would just be invaluable!"

Both teachers felt that the graphics within the resource disk were useful. Mrs. Tosh noted what was important to her when she said, "...especially graphics and pictures and things that would be invaluable." Mrs. Mac wanted to be able to copy the resource disk onto her computer. She felt it would aid her "programming" of the computer when she was building instructional material. "I need it. I need it. I can put it on my computer when I get mine."

Mrs. Tosh felt that the real advantage of computers was the ability of the computer to compute marks. She noticed the folder for report cards in the researcher's template files. She wanted to look at the master report card, the comment bank and the master spreadsheets.

Mrs. Tosh was amazed at what she saw on the resource disk. She stated, "Look at all this stuff. Oh, man...neat!!!!"

Both teachers would like computer equipment and programs which would provide an improved printed product for the classroom. An increase in printing speed, neatness and letter size were the improvements they wanted.

Teachers wanted one single all-inclusive program which they needed for constructing instructional material. Mrs. Mac commented, "... I do not want to get a whole stack of programs."

Mrs. Tosh recognized the need for a hard-drive when she found it difficult to duplicate on her Mac Plus the process used during the coaching sessions. Mrs. Tosh also wanted up-to-date, state of the art equipment such as a colour monitor. She wanted to know if the DeskWriter could print in different colours. Mrs. Mac expressed the need for practical program manuals. She wanted a concise version that was simple to follow.

Both teachers understood the need to have Macintosh computers in the school for the development of instructional material. They also felt that the introduction of the Apple IIe for student use had resulted in a detrimental effect on the purchase of a Macintosh for staff use.

Mrs. Mac wanted to know what computer equipment she needed to create the material the researcher had shown. She indicated this at the general presentation to the

teachers and continued to ask the researcher questions about equipment throughout the individual sessions. She wanted to duplicate the process on her Macintosh portable computer. She felt that her computer could be used in the classroom and at home. With the purchase of an Imagewriter printer for home and the use of the school printer, she felt that she could make good use of a portable computer. The researcher wondered if the struggle she observed as the equipment was carried to her school for the coaching sessions had any effect on her decision to purchase a portable computer. A phone call a short time later confirmed an immediate use for her portable. She enthusiastically reported that she was taking down the staff minutes with her machine and distributing them immediately after the staff meeting!

Mrs. Tosh was interested in having the best computer equipment, programs and resources. She wondered what the researcher would need in order to set up a demonstration for a school staff.

Mrs. Mac realized that she would have to spend more money buying paper and the necessary add-on peripherals. Mrs. Mac exclaimed "Imagine how much money I am going to be spending on paper and the rest of my toys." She also added, "I don't need to go out and spend more money" when discussing extras for her computer.

Both teachers quickly understood the analogy about the storage of files and folders in the Macintosh system. The analogy was to think of the Macintosh operating system as folders containing information sheets in a file cabinet.

Mrs. Tosh's understanding of the portability of text and data was limited. She was interested in the fact that IBM and Mac could exchange files. Her interest might have arisen from her husband's use of IBM at work and the fact that their family was considering purchasing another computer.

Mrs. Mac stated she would use the computer to create her own instructional material. She realized that inputting something into the computer took time. Modification of material already stored in the computer would reduce the time it takes to create variations of instructional materials. She liked the possibility of modifying instructional material for specific student's needs. Mrs. Mac enjoyed the process very much. After she completed her first student page, she exclaimed gleefully, "Finally! Progress!!!"

Mrs. Mac understood the memory problems associated with Macintosh. She said, "I am already using the amount of RAM I have." She continued, "Like I am already away beyond it. I have to upgrade." She said later that she would like to buy a new portable because it is "smaller yet—It has the works." She later restated that she had made the right selection in equipment.

I feel confident with Macintosh. I can't say that I would feel that with any other computer. Certainly with the Macintosh. I know where I am going, I know how to input, I know how to get my information...I know how to deal with it. I don't feel afraid or intimidated.

On the Apple IIe and gs she stated:

Waiting on an Apple is just...mind-boggling and I get really, really annoyed. And I can't stand to see the kids work on it, you know, I just can't stand it! It's so frustrating. It's so slow!

She explained that the Macintosh would be:

really accessible for them (students). They don't want, they don't need all this garbage (Apple IIe process). You know, give us something like a Macintosh where all they need, you know, is type in a key, for the computer, and select their program.

She stated that she appreciated the keyboard features, the mouse and the automatic saving features (from her Mac portable). However, she thought that:

I'd be happier if it were less weight and less money. Those are the two things...and colour...and a few other things they could add to the portable.

The portable battery was not a problem. She did, however, realize that the Apple IIe's did have an advantage for review of lessons and procedures taught. She stated:

They (students) need drill, and drill is so incredibly boring that I make it as interesting as possible and I think that the computer can certainly provide that drill and practice without being monotonous.

About the cost of equipment, Mrs. Mac said "And I don't want to spend...like I spent a lot of money on that portable. And I would definitely say I overspent." She continued "Like 'way over. And I don't ever want to do that again. I did that for a reason and I am happy I did it. But it costs."

One Year Follow Up

The teachers' reactions towards the resource disk were favourable one year later.

Mrs. Mac had purchased all she needed for equipment and was using the resource disk concept, while Mrs. Tosh had not yet purchased a hard-drive, but was using the resource disk process and MsWorks for making text and minor graphics.

Mrs. Mac's comments related to her new knowledge of computers and she did not dwell on the resource disk construction processes. Mrs. Mac stated the fact that it would take another year before she could fully develop her own resources because any resource development would reduce her preparation time. She felt that the portable allowed more flexibility to work either at school or at home. She expressed a need to make her instructional material suitable for the different students in her class and to have equipment and programs in the school which would make desk top publishing all encompassing. She did feel that the computer training should include uses for herself and her need to meet the needs of her students.

Mrs. Tosh's comments one year later were more about the construction process and not about her knowledge of computer processes. She found that equipment use and portability was a difficulty and she finally had to construct instructional material at home. She did use the templating process and some data base storage principles. However, this was difficult since she had not purchased a hard-drive for her machine.

Summary of Chapter Four

Prior to participating in this study, the two teachers differed in their proficiency with the Macintosh computer. However, both teachers had prior keyboarding skills and computer understanding from the Apple IIe use in their schools and from other experiences. They understood that the Macintosh environment with both text and graphic handling in a word processing program would facilitate construction of instructional material.

Their understanding of the computer and program procedures and skills grew in the easy-to-learn environment of the Macintosh and from the coaching provided by the researcher. Their understanding of the concepts of templating, data base storage principles and text/graphic relationships widened.

Their understanding of instructional selection hinged on what they needed at the time, what equipment and other resources were needed to make motivating instruction possible, the cost, and training necessary to construct instructional materials. Future technological developments were of interest because these would bring new innovations in equipment and programs which would be useful in the classroom.

The individual teachers felt that the coaching sessions, the shared resources and the

templates were necessary in understanding how to use the computer to build appropriate instructional material.

Both believed that the resource disk would save time constructing instructional material for their students and would be adaptable to their teaching style. It could, over the years, help in the quality of teaching as the information on the resource disk increased with use.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Teachers's reactions to the instructional materials constructed by teachers from the researcher's resource disk were the focus of this study. Findings related to the resource disk concept will be summarized under the following question, what is the initial reaction of teachers to a new technology based curriculum resource? This is followed by conclusions, implications, questions for further research and the researcher's reflections about this study.

Summary of the Research Design

This study investigated teachers' reactions to a resource disk on which was stored social studies instructional material at the grade four level. Teachers used the resource disk templates and generated multiple instructional materials.

The researcher participated as a resource person, or coach, during the construction sessions where the teachers constructed their own instructional material. The researcher recorded the two teachers' reactions while they produced their own teaching material.

During the resource disk's development, the Macintosh computer environment, the MsWorks program and the coaching method were preselected by the researcher. The Macintosh environment was chosen because it was easy to learn, and materials could be easily and quickly saved, edited and retrieved. The MsWorks program was chosen for the way it handled graphics. Individualized teacher instruction was used to help the teachers acquire practical understandings of the computer's capabilities and flexibility in constructing material for their personal style of teaching.

The individual coaching sessions gave the teachers an understanding of the computer processes and how these could be applied to the construction of teaching material. A major advantage to having information and templates in an organized computerized resource is to save time in modifying instructional material.

Summary of the Teachers' Initial Reactions

The two teachers were interested in suitable computer equipment and programs to achieve their instructional goals. Participation in the individual construction sessions with

the researcher yielded different results for each teacher. Mrs. Mac, the experienced teacher, grew in her creativity and computerized instructional resources. Mrs. Tosh, the beginning teacher used the computer to increase her print resources.

Five major aspects arose from the teachers' reactions to the resource disk. They were computer support, current needs, instructional material selection, understanding the computerized process, and an understanding of the new resource.

The reaction of the teachers supported the researcher's choice of the Macintosh computer, MsWorks program and the support of graphical and text material compiled on a computer resource disk. Numerous times, the teachers stated that using this method for creating student material was both easy and enjoyable. They commented further that the resulting products had a professional-looking quality to them and would be useful in the classroom.

The teachers contended that the resource disk templating and modification processes they had learned were useful for creating easily modifiable instructional material. Any computer procedures they wanted to use had to provide time-savings and integrate graphics and word processing. The resource disk offered easily modified materials within a wordprocessing program. Ragsdale (1991) recommended the learning of wordprocessing first for a person inexperienced in the use of computers.

The teachers wanted access to more digitized instructional resource material in order to decrease the time needed to input information into the computer. The individualized training with the benefits of modification and time-savings were useful. The teachers wanted to duplicate these new construction processes. They wanted to understand just enough of the process to suit their needs. Their appraisal of the resource disk concept involved discerning whether the resource disk met their needs and expectations.

When considering programs and equipment, the teachers wanted information regarding equipment advances and to become familiar with any new relevant application software. The teachers were interested in new computer capabilities and wanted those programs that offered the most advantages for construction of instructional material. Anderson (1982), Riding (1984), Songliet (1982), Watt (1982), Ehman and Glenn (1987) and Smiddie (1990) would support the availability of computer technology to suit their budgets.

In order to save time the teachers wanted the opportunity to choose the appropriate student material quickly. They wanted to be able to adapt the provided resource material to their students needs. Goodlad (1963) supports this.

Any computerized equipment and programs which contain useful instructional

resources and are more effective and faster than previous equipment and programs were desired by these teachers. Anderson (1982), Riding (1984), Songliet (1982), Watt (1982) also support the need for more efficient programs and equipment.

The teachers selected the instructional material from the resource disk according to its suitability, timing and ease of construction. Mrs. Tosh wanted resources which would not change drastically over time. Graphics, she felt, could be printed and photocopied to be used anytime with student material. Thus, instructional graphic resources offered in wordprocessing format would be useful to her. Ragsdale (1991) suggests the use of wordprocessing for beginning computer learners.

Mrs. Mac wanted to actively learn all she could about computers in order to make her own material. Trautman (1992) would suggest that Mrs. Mac's need for active learning was fueled by her endeavour to find a use for this new technology. She was interested in seeing and using other teacher-developed material, and in selecting the material she could use in her teaching. Ehman and Glenn (1987) noted this need to share with other teachers. Mrs. Mac agreed that the resource disk could prove invaluable. With each year of use it would widen and grow through modification and the addition of information (Carpenter, 1992). This would increase the time saving element in the construction of instructional material.

The current needs of the teachers were affected by the time of the school year and their professional experience. Certain selections the teachers found useful would be used at a later date or during the following school year. Mrs. Mac chose information from the classroom organizer folder on the resource disk. Producing this material herself would have been tedious, time consuming and repetitive and yet necessary for the organization of her classroom. Goodlad (1963) referred to this dull listing in his work.

The teachers desired instructional resources supporting their immediate needs for the students. Ehman and Glenn (1987) and Smiddie (1990) mentioned the problem of classifying and evaluating computer programs into instructional categories for differing educational uses. The instructional material must fit into teachers' existing personal resources and support their teaching style. The resources must be pedagogically sound and useful in their teaching. The resources must meet their student's needs and save teachers time in the preparation of appropriate material. In addition, teachers must be provided with training which supports their instructional style. If these are provided teachers will consider the resources useful in their personal classroom instruction. The concept of the resource disk is one way to provide this.

The instructional material must be organized so that it is easily accessible for

modification. Thus, hard drive storage was considered a necessity rather than using large numbers of disks to replace the file folders and binders they now had for storage of instructional material. Carpenter (1992), Hunter (1982) and Watt (1982) describe the existing computer information systems which could be used. Cummings (1992) offers other electronic systems and devices which would store this kind of instructional resource. As Barnes (1982) mentions, a resource center could offer a distribution point for this instructional material. Ehman and Glenn (1987) and Smiddie (1990) also suggest that the school could offer storage for instructional materials or a resource disk.

Mrs. Mac believed she needed efficient equipment and programs to support her creation of student material (Ehman and Glenn, 1987; Smiddie, 1990). She changed from collecting several kinds of programs, to finally realizing that one, well selected all-inclusive computer program was all she really had time to learn. She realized she had limited time to learn new computer programs. Deer and Neal (1987) found time to be factor. Even though there were some equipment shortcomings, she felt that the funds she invested in computer equipment gave her equivalent returns in time-savings and assisted her in the construction of material she wanted for her teaching.

Mrs. Tosh knew that she needed the right equipment, however, she did not invest in the upgrading of her Macintosh computer because she felt that the graphics were not plentiful enough. She stated that she found the photocopier more practical at school since her school did not have adequate computer equipment. Ehman and Glenn (1987) found that teachers tended to use the existing tools which provided convenience. Mrs. Tosh would prefer to keep hard-copy print-outs for photocopying rather than spend time searching through a large amount of material on disks. Nievergelt, Ventura and Hinterberger (1986) would suggest offering this convenience.

While the teachers were using the computer and resource disk, the researcher observed their skills and construction approaches. Through dialogue with the teachers the researcher could determine their level of understanding about the resource disk concept. They began to realize what the computer could do and to understand its operational procedures. Louis and Miles (1990) (cited by Farley, 1992, p.8) feel that the understanding of computer processes will only develop through experience.

The biggest difference between the two teachers was their reason for having prepared student material from the resource disk. Riding (1984) would suggest this may have been influenced by their creative abilities or by their understanding about the computer. Mrs. Mac wanted to understand the computer construction processes. Mrs. Tosh wanted motivational graphics to enhance her student material for the next school day.

Both teachers understood the template building processes. Mrs. Mac wanted to have templates at her finger tips. She would store the templates on her hard drive for quicker access. Mrs. Tosh wanted to have printed hard copies of the graphics to enhance her own personal instructional material by using the photocopying machine. Nievergelt, Ventura and Hinterberger (1986) found a similar phenomenon in their work. Ehman and Glenn (1987) would suggest using the photocopier process of cutting graphics out and pasting them onto the master to be photocopied, rather than learning a new computer process to do the cutting and pasting.

Conclusions

This section discusses conclusions based on an analysis of the initial reactions of the teachers to the instructional resource disk concept. These include the teachers' reactions to the researcher's predetermined choices in developing the resource disk and the teachers reactions to the templating and modification processes of the resource disk.

Researcher's Predetermined Choices in Developing the Resource Disk

The researcher's use of the Macintosh computer was an appropriate choice because the teachers quickly became familiar with Macintosh procedures, the application program functions, and the organization and storage of instructional material. The appropriateness of this choice was, in part, demonstrated by the purchase of a laptop by Mrs. Mac. Its portability provided access to a computer at home and at school, the two main locations teachers use for planning instruction. A computer which could be used at home and at school would offer convenience for instructional planning for a teacher.

Mrs. Mac and Mrs. Tosh realized that computer equipment that would produce acceptable copies of instructional material developed by teachers should be purchased by school boards. For personal equipment at home, they knew the cost would have to fit their personal budget.

A word processing program which incorporated graphics into its functions was desirable for the construction of instructional material. The teachers felt that they had the time to become familiar with only one integrated program which they needed for constructing all their instructional materials. Deer and Neal (1987) supports the two teachers' view that learning computer processes entails the acquisition of new skills.

Application program(s) that were chosen would have to be consistent in their

keystroke or menu functions, and offer easy manipulation and placement of graphics and text. The manipulation and placement of graphics should be determined by the user and not locked into a defined space or location by the program. The editing features of text and graphics should offer a flexible combination for final printing. These were the program capabilities all groups could use. The program choice should be determined or controlled by the teacher(s) in the school who will use it (Barnes, 1982).

The resources had to meet the Alberta Education's objectives and be useful to the teacher. The teachers felt that the resource disk could offer this, but development of more computerized resource material was necessary. The resources they chose were the resources which could fit into their personal style of teaching. So a resource disk would have to offer personal modification of instructional material.

The training of teachers should be based on each teacher's particular needs in the development of suitable instructional material. Assessing the suitability would mean that the teacher would have to spend a great deal of time appraising the information. Teacher training institutions could offer appraisal of instructional material suitable for modification according to factors related to students' needs, learning levels and modes of learning. Personal consultative support for teachers would decrease the amount of problem solving time required to modify existing instructional material.

Figure 3 illustrates the teachers' understanding of how the resource disk concept could be used in their classroom.

PROFESSIONAL		PERSONAL
support curricular guidelines What's up-to-date	Resources	suitable for my teaching style/student learning What's necessary
meet professional demands	Computer Equipment	meet my expectations
Capabilities	Computer Programs	easy to learn



Understandings of the digital resource disk processes will:

- meet curricular outcomes and teacher expectations
- make quicker and appropriate instructional material for teaching/learning styles
- provide a process for individualizing student learnings

Figure 3. Conclusions from the teachers' approach to construction.

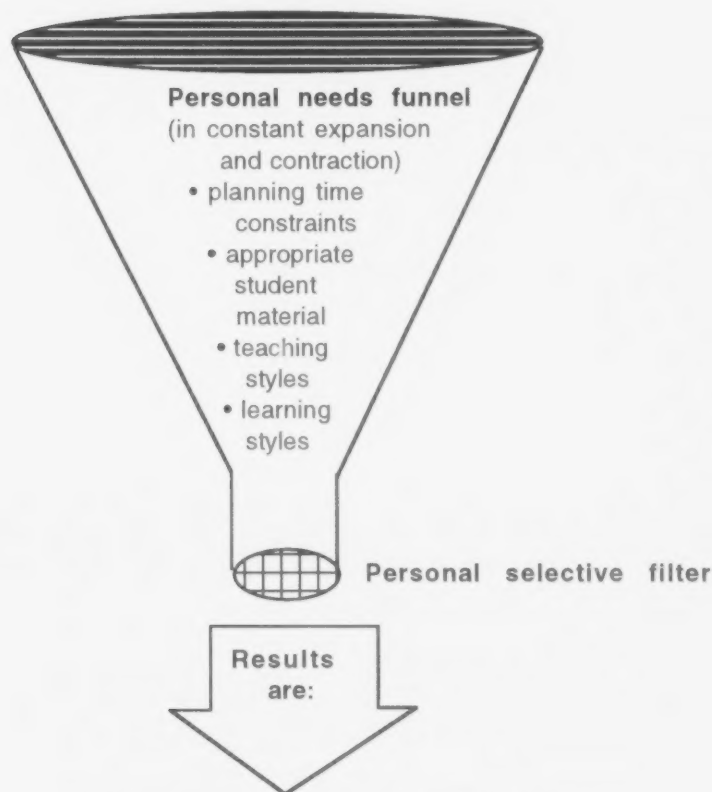
Teachers Reactions to the Resource Disk's Processes

The teachers reacted favourably to the resource disk templating and modification processes, and coaching. Ragsdale (1991) would credit this to the applied use of computer technology. Both teachers who received coaching in the construction processes greatly appreciated the help that was given. Louis and Miles (1990) (cited by Farley, 1992, p. 8) would credit this to the experimentation that was allowed and the new use or meaning for

the computer technology. The teachers felt that the personalized instruction allowed them to test their understanding and experiment with their computer. Fullan (1991) (cited by Farley, 1992, p. 8) would sum this up as the need to immerse oneself into the computer innovation. Figure 4 shows how the elements of this study come together.

Resource Disk Concept Containing:

Resources, Teacher Training,
Computer Equipment and Computer
Programs from Figure 3.



USEFUL MATERIAL AND PROCESSES

- Equipment** - the necessary computer equipment which would allow easy learning, retrieval, storage and a professional copy of instructional material
- Programs** - easy to learn and offer functions useful for the creation of instructional material
- Training** - allowing practical understanding and experimentation of computer application to the teaching profession through personalized construction
- Resources** - computerized data base allowing selection of resources for the teacher's personal instructional material for each student in her class

Figure 4. Teachers' reactions to the resource disk

The coaching facilitated communication and understanding between the researcher and the teacher. The experiences were shared, comprehended and tested. This kind of experimenting is supported by Louis and Miles (1990) (cited by Farley, 1992, p. 8). This was demonstrated by Mrs. Mac's acceptance of the resource disk process. One year later, she was not worried about understanding computer processes and her understanding of equipment requirements was growing. She felt the school needed to provide access to computer equipment so that she could make instructional material more easily. Louis and Miles (1990) (cited by Farley, 1992, p. 8) would credit this growth of understanding to Mrs. Mac's new meaning for computer change.

Implications

Teachers should be encouraged to use a computer which would provide them with a method of constructing instructional material. The integration of graphics and text material should be the major program consideration. The teachers felt that the school should provide the equipment necessary to construct and print a professional copy of the material they produced. Teachers who construct instructional material on their home computers are denied the opportunity to make last minute modifications unless the school has adequate equipment. If a Macintosh computer were available, school personnel could be used to input text and graphic material from the school's resources into the computer. This material could be used later for the preparation of new instructional material. The PowerBook, or laptop may be the answer for home and school instructional planning.

If a computerized resource center or disk were to be provided, teachers would require the appropriate equipment, programs, and a suitable budget. Computerized instructional material and training would have to be provided. The teachers felt that the resource disk and corresponding computer processes saved preparation time while creating, adapting or modifying instructional material for their student's individual needs. Riding (1984) and Torrance (1970) express a need for creativity to solve problems related to a student's needs. The resource information should be available on a computer disk or through modem access from a computer resource center. Goodlad (1963) supports the need for a centrally available Resource Center. The necessary training would have to be available from a qualified person who could come to the school.

Teachers need adequate personal and centralized storage facilities, where instructional material could be stored, especially the text information and graphics that

would not change drastically over time. A teacher/data base manager could form the appropriate categories for storage and labeling of material. Goodlad (1963) and Barnes (1982) would agree with using a teacher with computer/curricula knowledge to manage the database.

The main advantage of the resource disk is that the material on it is easily modifiable. Print resources are at present, less expensive, more accessible, portable, and more easily viewed and referenced than high resolution monitors, fast computers and bulky peripherals. Therefore, print material would be easier to view than computer screens. Research supports this (Nievergelt, Ventura, and Hinterberger, 1986). However, if the teacher was considering suitable instructional changes for specific student groupings, computerized materials would have the advantage over existing print resources. Mrs. Mac and Mrs. Tosh recognized the advantages and disadvantages of both print and computer capabilities to construct their own instructional material.

The usefulness for teachers is an important consideration in any teacher training program related to new technology. Anderson (1982), Nievergelt, Ventura and Hinterberger (1986) and Riding (1984) say the training must be appropriate to the user. If the computer offers an effective construction process appropriate to a teacher's need in the classroom, teachers will endorse its use (Farley, 1992). Louis and Miles (1990) (cited by Farley, 1992, p. 8) would agree that computer use must have a meaningful application and not just be a vision of the future.

Teachers should be shown how to move text and graphical information from one program to another, easily and without losing the instructional material the teachers themselves have made. Ragsdale (1991) suggested that computer application programs be used for training the inexperienced teacher. Teachers should be allowed the opportunity to transfer computer data from one brand of computer to another as well as other programs. This portability would enhance the teachers' willingness to invest time in creating text-data files on their own computer if they realized that their invested time in developing material would not be lost when computer technology advances.

Individualized training is necessary if teachers are to understand the construction process and how it relates to their own teaching style and personal resources. This method would make the acquiring of new computer skills quicker and more relevant to the learner. Deer and Neal (1987) support this method of teaching new computer skills. Coaching was used to train the teachers in this study. Trautman (1992) and Louis and Miles (1990) (cited by Farley, 1992, p. 8) claim that experimenting with a facilitator helps expedite the understanding of computer technology. The study showed that through the resource disk

process, Mrs. Mac became more computer literate and began to experiment with and adapt computer resources she could use in her teaching.

Inservicing could be effective by offering the teachers the opportunity to develop instructional materials relating to their own style of teaching. Ehman and Glenn (1987) support this endeavour to share teacher generated material. Groups of teachers could meet in a computer lab where the instructing teacher facilitates the creation and modification of instructional material that could be shared with those in attendance and offered on a computer bulletin board. Sharing would be enhanced and useful to the teachers if the group was formed on the basis of teaching style. Again Ehman and Glenn (1987) support the need to share. This interest group could also meet to share and exchange resource material on disk. This kind of inservicing would build a teacher's file of personal instructional material.

When a new resource is introduced to teachers at the classroom level, resources and strategies given to the teachers should include the selections which are useful for the teacher's personal teaching style and collected resources. Trautman (1992) and Louis and Miles (1990) (cited by Farley, 1992, p. 8) suggest that experimenting with computer use will derive meaning for the computer in the teachers' professional lives. Barnes (1982) suggest collection of resources should be left to the school and its teachers while Goodlad (1963) and others would prefer a central distribution point. However it is done, teachers will be better able to produce appropriate instructional materials, if choices for instructional and professional materials are provided in the resource and in its introductory training.

Further Research

The teachers valued the opportunity to make selections of student materials that they felt were appropriate. Questions about selection which arose from this study are as follows:

- What student needs prompted selection of instructional material?
- What teacher needs prompted selection of instructional material?
- How did the teachers decide which choices were appropriate? Why?
- Which processes used in selection were more efficient and appropriate for instructional material selection?

It would be interesting to know how many teachers would buy a computer if they had a professional use for a computer and appropriate peripherals, thus:

- What other factors would influence purchase?

- Where does professional consideration as compared to personal considerations fit in the purchasing criteria?

Instructional resources used by teachers take many forms. Numerous questions related to the choices teachers make arose from this study of the modifications teachers made to an existing resource. Further research is needed in order to address the questions which follow.

- Which type of computerized resource would teachers prefer? Complete units or collections of data? What factors would determine which teachers wanted a prepared unit and which teachers wanted to learn the entire computer process using the resource disk?
- How do teachers choose supplementary material? What prompted these decisions?
- What are the curricular understandings the teachers use to select instructional resource material? What would make these decisions universal or unique to the individual teacher?

The issue of training teachers to understand and use a technological device such as a computer deserves further study.

Researcher's Reflections

The resource disk concept was a good idea for 1990 because it made use of the technology that was available to teachers at that time. However, computer technology has changed rapidly since that time. Voice input is becoming another way of inputting data instead of the traditional keyboarding. In the future it will offer better possibilities. Compact disks are offering vast information storage. Clipart and text information on CDs can be stored and retrieved by teachers wishing to use graphics or factual information. Larger hard drives are now standard with the purchase of a computer. Better computer performance is possible with a hard drive. All types of scanners are available to transpose printed material into a digitized form. Reflex and video cameras can input pictures into the computer.

This technology makes the computer more useful in the creation of instructional material for students. Mrs. Mac and Mrs. Tosh would welcome this information. If the instructional information could be easily found, adapted and modified without consuming their preparation time and the processing method wasn't hard to learn, Mrs. Mac and Mrs. Tosh would probably embrace this technology.

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Appendices

Appendix A

The enclosed disk in this appendix is a sample of the resource disk files. The samples were selected and organized under the following folders on the resource disk. Only the files referred to in this thesis are included in this Appendix.

Sample Resource disk				
7 items		206K in disk		
	Name	Size	Kind	Last Modified
▷	How to use	12K	folder	Sat, Mar 27, 1993, 7
▷	Index	5K	folder	Sat, Mar 27, 1993, 7
▷	LEVEL ONE EXAMPLES	20K	folder	Sat, Mar 27, 1993, 7
▷	LEVEL TWO CONTENT EX...	37K	folder	Sat, Mar 27, 1993, 7
▷	Teacher Files Viewed	35K	folder	Sat, Mar 27, 1993, 7
▷	Technical Documentation	—	folder	Sat, Mar 27, 1993, 7
▷	Templating Examples	37K	folder	Sun, Mar 28, 1993, 1

APPENDIX B

MRS. MAC'S CONSTRUCTION MATERIAL

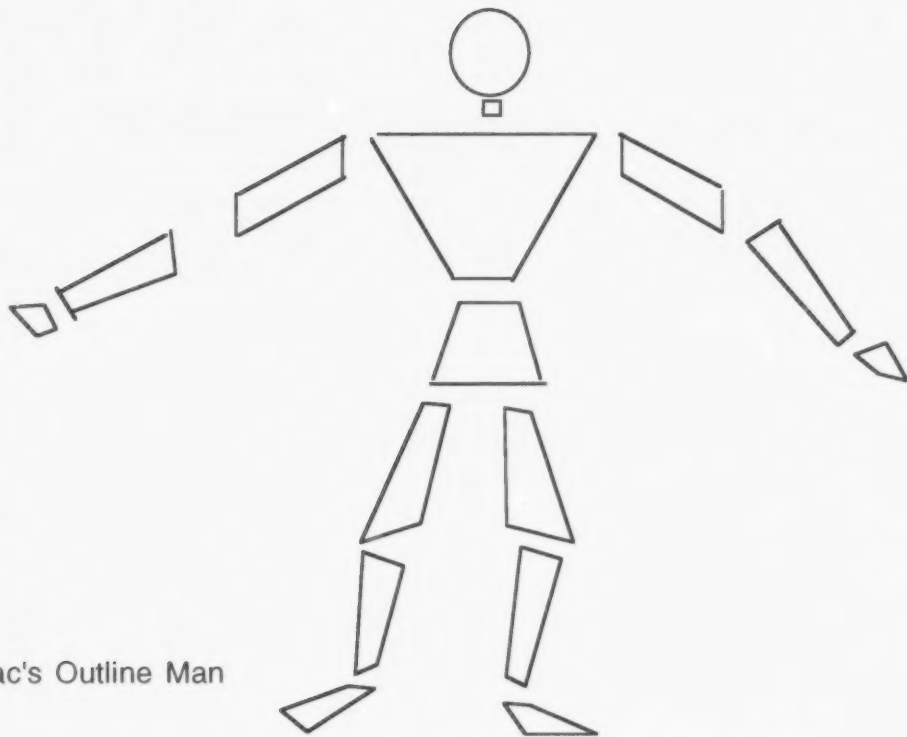
The construction examples are shown in the order that Mrs. Mac made her instructional material during the three sessions.

Tom

Wayne

Sue

French Body Parts



Mrs. Mac's Outline Man

French/English Vocabulary Sheet

yes	oui
-----	-----

no	non
----	-----

hello	bonjour
-------	---------

goodbye	au revoir
---------	-----------

please	s'il vous plait
--------	-----------------

thank you	merci
-----------	-------

red	rouge
-----	-------

blue	bleu
------	------

yellow	jaune
--------	-------



Quebec's Neighbour Map (Enlargement and Modification made in SuperPaint)

Name _____

Water bodies of Quebec

Draw in the rivers and lakes of Quebec. Use the list below.

Quebec Map

Map constructed in SuperPaint
and imported to MsWorks.



Name _____

Geography of Quebec

Using the following colours to show heights of the land, colour in the map of Quebec. Remember to use an atlas.

- | | |
|--------------------------|---------------------------|
| ☐ | Dark brown for mountains |
| ☐ | Light brown for plains |
| ☐ | Green for valleys |
| ☐ | Blue for rivers and lakes |

QUEBEC

NAME:

1. Name the capital city of Quebec.
2. List the major waterways (rivers, lakes, etc.).
3. List the mountain ranges.

Draw the symbols in the square. Use different colors for each symbol.

Capital City

Mountains

Major Waterways





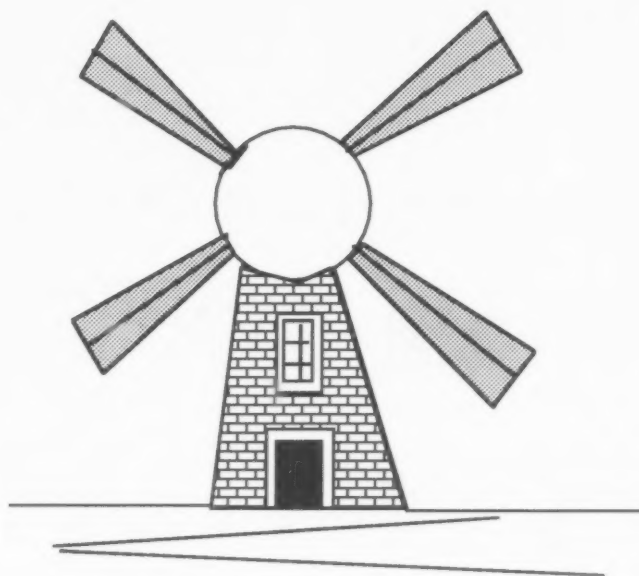
This certifies that

***has successfully
participated in providing
Room 12 with a healthy,
friendly, learning
environment.***

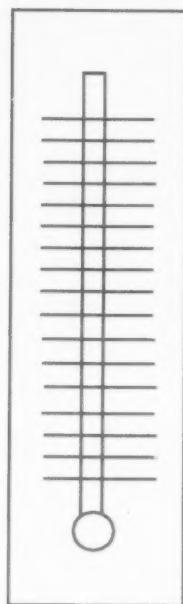
Mrs. Mac

MRS. TOSH'S CONSTRUCTION MATERIAL

The construction examples are shown in the order that Mrs. Tosh made her instructional material during the two sessions.

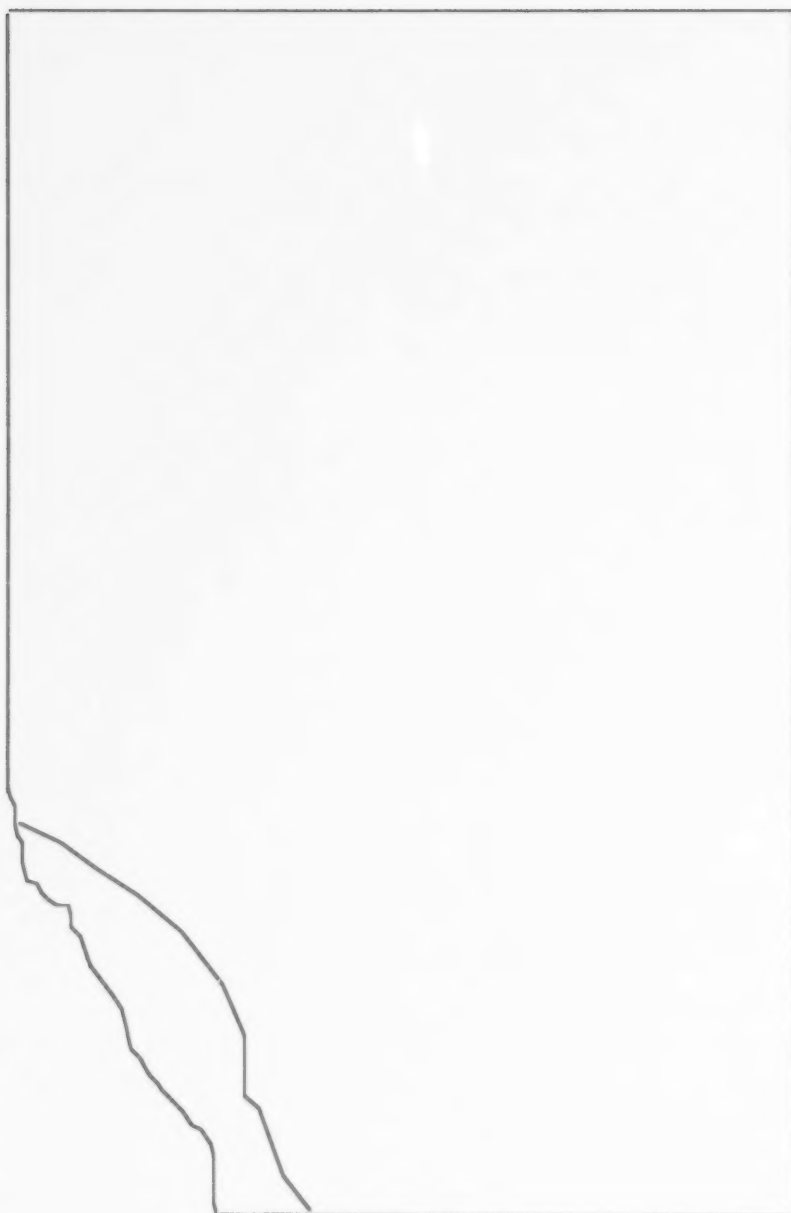


WINDS AND CONVECTION



HEAT
AND
TEMPERATURE

MYSTERY
SOLIDS



Map of the Western Provinces pasted to the scrapbook after taken from SuperPaint



